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Abstract

REVIEW OF THE STUDIES UNDERTAKEN IN THE U.A.R. FOR EVENTUAL DISPOSAL OF LOW ACTIVITY WASTES OF STRONTIUM, RUTHENIUM, CAESIUM AND CERIUM INTO THE GROUND

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The problem of disposal of radioactive wastes constitutes one of the important aspects influencing the development of the peaceful application of atomic energy, particularly in relation to its impact on the economics of nuclear power. The present paper summarises the fundamental data obtained in the U.A.R. Atomic Energy Establishment precluding the feasibility of ground disposal of such wastes in soils and on minerals from the country. Radionuclides were exemplified by radioactive ruthenium, caesium, strontium and cerium; while ground matrix was tested on Mokattam and Sinai clays, sands from Reactor Site at Inshas, Nile valley phosphorites, zircon placers, Aswan hematites, etc... . These ores and soil minerals were studied for various sizes of their particles and over a wide range of pH values. The paper collects also the fundamental data for optimising the decontaminating efficiency of each alternative. Batch as well as column experiments were undertaken and complete analyses of soils and clays spectrographically as well as by X-ray powder diffraction are given.

A classification of minerals and radioelements in the order of efficiency of decontamination is given, as also calculation of exchange capacities. The effect of trace impurities of iron and calcium in enhancing uptake is also investigated.

A mixed bed is foreseen for decontaminating low active wastes of these radioelements. Further investigations are envisaged for other radioelements and other minerals to enable the determination of the final specifications of the mixed natural bed.

The physiochemical laws governing the disposal of other heavy radio-elements, particularly thorium and uranium, into the ground are presented in a second paper to this conference.